

MINISTRY of TECHNOLOGY

Warren Spring Laboratory

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## Air Pollution Abstracts

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Ministry of Technology

**WARREN SPRING LABORATORY**

**AIR POLLUTION ABSTRACTS**

**February 1969**

1. General
2. Emissions and sources
3. Identification and measurement
4. Distribution (surveys, chimney heights, meteorology)
5. Effects on humans, animals, vegetation, etc
6. Administration (programmes, standards, legislation)
7. Methods and equipment for abatement
8. Miscellaneous

The original papers to which these abstracts and titles refer can in most instances be obtained through the local public library. In case of difficulty enquirers may refer to Warren Spring Laboratory. Only items marked (L) or with a five digit number prefaced by a letter are available in Warren Spring Laboratory Library.

Abstracts covering the whole field of fuel technology appear in "Fuel Abstracts and Current Titles" obtainable on subscription from the Institute of Fuel.

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In addition to original sources, the following abstracts journals have been used:

APCA Air Pollution Control Association Abstracts, September 1968

CA Chemical Abstracts, 8 July 1968, 22 July 1968, 29 July 1968

February 1969

# 1. General

A 12568

02010, 02898, 02914, 05800

Kramer, H.P.

ENVIRONMENT - PAST, PRESENT, FUTURE: A century survey of environment  
Envir. Sci. Technol., Aug. 1968, vol. 2, 602-605. (L)

A historical survey of the progress achieved during the last 100 years in the field of environmental control in the U.S. is presented.

A 12569

02028, 02040, 02043, 02461, 02615, 02642, 02681, 02914,  
03135, 03576, 03731, 03777, 03882; 02614, 02786; 02898

Rihm, A.

AIR POLLUTION

Dangerous Properties of Industrial Materials, 3rd edn., Reinhold Book Corp., New York (etc.), 1968, 109-127, 19 refs. (L)

This part of the book covers the following topics: sources of contamination (particularly the combustion of fuels), pollution-influencing factors (especially the weather), health aspects (air pollution incidents, air pollution and disease), economic aspects, air quality standards, sampling and analysis, and tracer detection.

A 12570

02914, 03660; 02043, 02964, 03490, 03526; 02040

Sax, N.I. (editor)

DANGEROUS PROPERTIES OF INDUSTRIAL MATERIALS

New York: Reinhold Book Corp., 1968, 3rd edition, 1251 pp. (L)

Contains, inter alia, the sections: Toxicology (p. 1-23); \*Industrial air contaminant control (p. 24-68); Control of environmental pollution, subdivided into part 1: \*Managing environmental quality (p. 77-108), part 2: \*Air pollution (p. 109-127), and part 3: The problem of solid wastes (p. 128-132); and Radiological environmental pollution control (p. 227-256).  
\*(For abstracts of these sections individually, see A 12569, A 12626, A 12640)

## 2. Emissions and sources

A 12571

02136, 02672, 02729, 03240, 03312; 02137, 02316, 02921,  
03312, 03423, 03700

Chakraborty, B.B. and Long, R.

THE FORMATION OF SOOT AND POLYCYCLIC AROMATIC HYDROCARBONS IN DIFFUSION FLAMES.

Part 1.

(APCA)

*Combustion and Flame* 12 (3), 220-36

(June 1968).

The amounts of chloroform soluble material, polycyclic aromatic hydrocarbons (PCAH), and carbonaceous residue (CR), in the dry soot recovered from an ethylene diffusion flame have been determined and the effects on these of changes in the oxygen index (i.e., the mole fraction of oxygen in the mixture) of oxygen-nitrogen and oxygen-argon mixtures supplied to the flame have been investigated. In the oxygen-nitrogen mixtures, there is a rapid decline in the amount of PCAH in the soot as the oxygen index increases from 0.18 to 0.26. The amount of soot reaches a maximum at an oxygen index of about 0.26 and above this value it declines rapidly being then composed almost entirely of carbonaceous material. The decline in the amounts of individual PCAH in the soot with increase in oxygen index has been investigated. Substitution of nitrogen by argon leads to higher temperatures in the reaction

A 12571

and pyrolysis zones and at lower oxygen indices the effect is to favor the formation of CR and to lead to a reduction in the amount of PCAH in the soot. At higher oxygen indices, the amounts of soot (actually CR) are less. From the point of view of air pollution, the results emphasize the undesirability of either a general, or local, depletion of oxygen.

A 12572

02136, 02657, 02672, 02729, 03240, 03312; 02137, 02316,  
02921, 02925, 03312, 03700

Chakraborty, B.B. and Long, R.

THE FORMATION OF SOOT AND POLYCYCLIC AROMATIC HYDROCARBONS IN DIFFUSION FLAMES.

Part 2.

(APCA)

*Combustion and Flame* 12 (3), 237-42

(June 1968).

An ethylene-air diffusion flame gives much more soot, carbonaceous residue (CR), chloroform soluble material and polycyclic aromatic hydrocarbons (PCAH) contained therein, than does an ethane-air diffusion flame burning under roughly similar conditions. The concentration of PCAH is much greater, however, in the soot from the ethane-air diffusion flame. The addition of hydrogen to the ethylene of the ethylene-air diffusion flame leads to a decrease in the amounts of soot and CR and, above about 0.4 mole hydrogen per mole of ethylene, to an increase in the amounts of chloroform soluble material and PCAH. A 1:1 ethylene plus hydrogen mixture gives a soot which contains PCAH in about the same concentrations as found in the soot from an ethane-air diffusion flame, although the amounts of soot, CR, chloroform soluble material and

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## 2. Emissions and sources

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### A 12572

PCAH are roughly 2.6 times greater. The results suggest that in the pyrolysis zone of a diffusion flame, ethane is rapidly decomposed to ethylene and hydrogen. The ethylene then decomposes, probably via acetylene to give soot and PCAH respectively

### A 12573 02008, 02672, 02729, 02921, 02927, 03251, 03312, 03700

Fenimore, C.P. and Jones, C.W.

#### COMPARATIVE YIELDS OF SOOT FROM PREMIXED HYDROCARBON FLAMES (APCA)

Com--

*Bustion and Flame* 12 (3), 196-200 (June 1968).  
Ethylene and acetylene gave eight times more soot when burnt with nitrous oxide than when burnt with oxygen. The comparison was made in flames having the same temperature, and about the same peak concentrations of species from which the soot is supposed to grow (hydrocarbon radicals, acetylene, and polyacetylenes). We suggest that more effective oxidation of the soot aggregates, particularly during their early stages of growth, occurred in oxygen flames, and this decreased the yield. Hydrogen chloride added to acetylene-oxygen flames increased the yield of soot without increasing the concentrations of polyacetylenes. Here too, the yield may have been altered mainly by changes in the oxidation of the early soot aggregates.

See also: A 12569, A 12631

### 3. Identification and measurement

A 12574 02642, 03576

Achinger, W.C. and Shigehara, R.T.

A GUIDE FOR SELECTED SAMPLING METHODS FOR DIFFERENT SOURCE CONDITIONS

J. Air Pollut. Control Ass., Sept. 1968, vol. 18, 605-609, 7 refs. (L)

Present standardized methods (ASME Power Test Code 27, Western Precipitation Bulletin 50, etc.) of stack sampling usually stress sampling under conditions of steady flow (no variation with time) in order to obtain data representative of the source emissions. On many occasions these standardized methods are applied when the velocity and/or the mass flow rate of pollutants do vary with time, thus impairing the accuracy of the sampling results. In addition, it is difficult to evaluate any inaccuracy of the sampling data. This paper classifies these two source variables into four categories and suggests basic sampling approaches for each type of source condition.

A 12575 02050, 02415, 02431, 03135, 03192, 03576, 03777, 05650

Booras, S.C. and Zimmer, C.E.

A COMPARISON OF CONDUCTIVITY AND WEST-GAEKE ANALYSES FOR SULPHUR DIOXIDE

J. Air Pollut. Control Ass., Sept. 1968, vol. 18, 612-615, 3 refs. (L)

A comparison of the two most common methods used by air pollution control agencies for the analysis of sulphur dioxide is discussed. Samples were collected simultaneously (502 pairs) for an eight month period at eight sites in the City of Chicago, using the West-Gaeke and conductivity methods. These methods are analyzed statistically to ascertain the existence of a factor describing adequately any differences between methods.

A 12576

02030, 02080, 02255, 02359, 02399, 02613, 02614, 03104,  
03226, 03271, 03526, 03881, 03951, 05650; 02333, 03312,  
03777

Brar, S.S.

DESCRIBES TECHNIQUE FOR TRACE ELEMENT DETECTION

J. Air Pollut. Control Ass., Sept. 1968, vol. 18, 621. (L)

Tiny amounts of dust containing chlorine, aluminum, manganese, and other chemical elements that are not normal products of combustion find their way into the air when coal, oil, and refuse are burned. These impurities may or may not be hazardous; however, before they can be evaluated, they must be collected, and their relative abundance must be determined.

A method of doing this was described on May 16 by Sarmukh S. Brar of the Division of Biological and Medical Re-

search of the Atomic Energy Commission's Argonne National Laboratory. Speaking at the seventh national meeting of the Society for Applied Spectroscopy, in Chicago, Brar described progress in a program to make neutron activation analyses of airborne particulate matter in Chicago.

The Argonne study was an effort to develop methods of gathering information on trace elements in dust, rather than an effort to point out the significance of these trace elements. How-

### 3. Identification and measurement

#### A 12576

ever, according to Carl E. Moore of Loyola University and his associates, particles of substances such as sodium chloride and salts and oxides of manganese and vanadium act as catalysts which greatly enhance the conversion of sulfur dioxide in the air to sulfuric acid.)

Concentration of the trace elements was found to be greatest in areas where smoke pollution over Chicago is normally the greatest. Concentration of chlorine ranged from 61 to 587 hundred-thousandths of a gram per cubic meter; aluminum concentrations ranged from 48 to 318 hundred-thousandths of a gram; concentrations of manganese varied from 10 to 90 hundred-thou-

sandths of a gram; and concentrations of sodium ranged from 8 to 67 hundred-thousandths of a gram. Bromine concentrations were between 24 and 323 millionths of a gram; and vanadium concentrations ranged from 22 to 1211 ten-millionths of a gram.

#### A 12577 02201, 02372, 02873

Chavín, P. and Lebbe, J.

CHROMATOGRAPHY OF AROMATIC HYDROCARBONS. I. GAS CHROMATOGRAPHIC DETERMINATION OF AROMATIC HYDROCARBONS IN THE AIR OF WORKING ENVIRONMENTS  
(CA)

*Occup. Health Rev.* 1967, 19 (1-2), 3-10 (Eng). A column 2 mm. long with an outside diam. of 6.35 mm. is packed with bis( $\beta$ -cyanoethyl)formamide-45-40 mesh Chemisorb W (30:100). With N as carrier gas the column is calibrated at 85° before and after each detn. by using a known mixt. of C<sub>6</sub>H<sub>6</sub>-MePh. A 10-ml. air sample is injected into the column for anal. With a Microtek 2500R chromatograph, MePh and C<sub>6</sub>H<sub>6</sub> can be detected at 71.0 and 2.0 ppm, and show a standard deviation in peak height of 1.1 and 0.2 mm., resp.

#### A 12578 02204, 03120: 02967, 03709; 02018, 02023, 02094, 02431, 02432, 02681, 02925, 02934, 03069, 03777, 03881, 03990

Dierkes, G.

APPLICATIONS AND LIMITATIONS OF PHYSICAL ANALYZERS IN INSTRUMENTATION  
(In German)

(CA) 6-11. Principles are explained of gas anal. using ir absorption, thermal conductivity, magnetic susceptibility, and elec. cond. as the variables being measured. Ir absorption can be used for heteroatomic nonelementary gases. The Lambert-Beer curve may be approximated to a straight line (max. deviation from linearity 10% at the central section); the cuvette length must be selected accordingly. Thermal conductivity measurement with a Wheatstone bridge is suitable for detn. of H<sub>2</sub>, SO<sub>2</sub>, CO<sub>2</sub>, and NH<sub>3</sub>. In this case, identical treatment of sample and reference gas (e.g. drying) is essential. Magnetic susceptibility measurement is based on the "magnetic wind," a gas circulation in the magnetic field, enhanced by the presence of O. Increased circulation velocity produces a thermal imbalance between sample and reference gas. Conductance measurement is based on chem. reactions changing the ion concn. in a soln. It is used for the detn. of traces of H<sub>2</sub>S, SO<sub>2</sub>, NH<sub>3</sub>, and H<sub>2</sub>O. Measurement of SO<sub>2</sub> in flue gas requires the pretreatment of dust pptn. above the dew point (130°), water condensation at 2°, and special filtration to remove last traces of H<sub>2</sub>SO<sub>4</sub> and SO<sub>3</sub>. Only after this treatment the gas can be used for ir absorption measurement.

#### A 12579 02521, 02804, 03120, 03476

DRAEGER GAS DETECTOR PUMP MODEL D 41 FOR CONTINUOUS MEASURING, DESIGNED FOR GAS DETERMINATION WITH DRAEGER TUBES (In German)

(CA) *Draeger-Hefte* 1967, No. 267, 18-23 While measurements of the max. admissible concn. at working sites with test tubes require but a few pump strokes (up to 20) and can therefore be made manually, emission measurements in the open atm. require continued pumping. The pump, operated in connection with Draeger test tubes, weighs 12 kg. and is equipped with a stroke counter (automatic setting of 1-9999 strokes), timer (up to 120 min.), setting for intermittent pumping (intervals between individual strokes of 1-30 min.) and battery for measurement where no current supply is available.

### 3. Identification and measurement

A 12580 02022, 03624, 03955; 02060, 02137, 02372, 02655, 02921,  
03215, 03697, 02710

Feldstein, M., Balestrieri, S. and Levaggi, D.N.

SILICA GEL IN SOURCE TESTING

(CA)

*Amer. Ind. Hyg. Ass. J.* 1967,  
28(4), 381-5 (Eng). This study was concerned with the efficient collection of org. vapors on an adsorbent, and the quant. removal of the adsorbate for anal. The adsorption app. consisted of 3 probes (1/4 in. X 6 in.) contg. 20 g. of Davidson silica gel PA 400 (8 to 16 mesh, predried at 110-120° for 2 hrs.) arranged in series. By use of a constant-drive syringe pump, 25 to 50  $\mu$ l. of the org. material was injected into the flask. Larger vols. were injected manually over a 5-10-min. period. The flask was heated by a heating mantle to 45-50°, or to 120° for higher boiling materials. Air was drawn through the flask and probes at 0.25 ft.<sup>3</sup>/min. for 1 hr. The contents of the probes were then poured into sep. 125-ml. Erlenmeyer flasks for desorption and anal. Simple compds. such as aromatic hydrocarbons, esters, and ales. were detd. by gas chromatog., whereas complex materials such as Stoddard solvent and VMP naphtha were analyzed by ir. Me<sub>2</sub>SO was an efficient eluant for all the materials studied except for solvent mixts. such as Stoddard and naphtha, and

#### A 12580

hydrocarbons contg. >8C. In the latter cases, an eluant of CS<sub>2</sub> and H<sub>2</sub>O gave good recovery. One silica gel probe was sufficient for simple studies; in the case of field studies where sampling times may be longer, concn. of solvent is generally high, and greater quantities of H<sub>2</sub>O may be present, the efficiency of adsorption is decreased, and it is advisable to use 3 probes in series.

(ir means 'infrared analysis'). (Abbreviated abstract).

A 12581 02114, 02157, 02209, 03709, 03951, 04027; 02049, 03133,

Fisher Scientific Co., Jarrell-Ash Division

05910

AUTOMATED DEVICE FOR MUNICIPAL AIR POLLUTION STUDIES DELIVERED

Envir. Sci. Technol., Aug. 1968, vol. 2, 637. (L)

An automated absorption spectrophotometer developed by the Jarrell-Ash Division has twice the speed and ten times the sensitivity of conventional instruments, according to the company. The prototype instrument was delivered to New York City Air Pollution Control Department. The instrument will be used to correlate metallic airborne pollutants at 38 Manhattan locations with weather, industrial activity, and traffic conditions. The analysis for 12 elements is called for in the programme which will require only 15 hours of instrument time for a weekly load of 3192 determinations. Sensitivities range from 0.2 ppm for vanadium down to 0.005 ppm for beryllium and 0.002 ppm for zinc.

A 12582 02030, 02521, 03240, 03333; 02106, 02137, 03236, 03331,  
03464

General Electric Co.

IMPROVEMENTS IN THERMOPARTICULATE ANALYSIS OF NITROGENOUS MATERIALS (Patent)

(CA)

Brit. 1,112,202  
(Cl. G 01n), 01 May 1968, US Appl. 29 Mar 1965; 8 pp. In the detection of nitrogenous material, such as pyridine, nitrobenzene, aniline, proteins, and bacteria, the filtered, vaporized sample is pyrolytically converted to NO<sub>x</sub> in an O<sub>2</sub> atm., purified from C particles by filtration, and converted to HNO<sub>3</sub> by reaction with H<sub>2</sub>O. The acid is converted to a salt by reacting with a substance capable of donating an electron pair, such as NH<sub>3</sub>, amines, and N<sub>2</sub>H<sub>4</sub>. The 2 steps can be conducted simultaneously by introducing NH<sub>3</sub> in a reaction converter contg. aq. soln. of the salt. The nitrate particles are introduced in condensation nuclei detector, where its relative humidity was raised to 400% and water droplets formed by condensation on the nuclei particles (0.01-0.1  $\mu$  in diam.) are detected by a dark field optical system. Concentrations of 10-10<sup>7</sup> particles/cm.<sup>3</sup> of gaseous samples can be detected.

### 3. Identification and measurement

A 12583 03662; 03192, 03658  
Hird-Brown Ltd.

KEEPING A WATCH ON SMOKE  
Fin. Times, 11 Nov. 1968, 8. (L)

Hird-Brown of Bolton, Lancs., has developed a new smoke density monitor, Type SDS, which comprises a control unit, a projector supplied from a low

voltage transformer, and a photo-cell receiver unit. Additional units include alarm bells, indicating meters (up to 100 per cent. obscuration), a voltage stabiliser, and a roll chart recorder.

Projector and receiver units can be mounted in a chimney so

that the smoke will interrupt the beam of light. The highly sensitive photocell converts light received into electrical energy and a varying current is emitted by the cell as the density varies. An alarm can be made to operate when the smoke reaches a pre-set density.

A 12584 02427, 03053, 03120, 03576, 03605, 03777, 03919  
Huey, N.A.

THE LEAD DIOXIDE ESTIMATION OF SULPHUR DIOXIDE POLLUTION  
J. Air Pollut. Control Ass., Sept. 1968, 610-611, 5 refs. (L)

Traditionally, sulfation candles have been for the most part analyzed by the gravimetric barium sulfate procedure. This procedure is time consuming, is monotonous for the analyst, and serves to limit the quantity analyzed. A more convenient procedure was needed even if some analytical accuracy had to be sacrificed. The turbidimetric barium sulfate procedure was therefore adapted to the analysis of sulfation candles.

With this new system of measuring sulfation, it is possible to operate sulfation networks of 100 to 1000 stations at

a very nominal cost. Choice of sampling site location is greatly simplified by the smallness of the sulfation plates. With the increased analytical sensitivity it is not unreasonable to shorten the present 1-month exposure period to 1 day.

A 12585 03120, 03243, 03380  
Koudelka, R. and Vodvarka, Z.

DETERMINATION OF NITROGEN OXIDES IN THE ATMOSPHERE (In Czech)

(CA) *Cesk. Hyg.* 1968, 13(2), 90-5

Air samples are drawn through a 0.125*N* NaOH soln., the absorbed mixt. of  $\text{NO}_2^-$  and  $\text{NO}_3^-$  is reduced to  $\text{NO}_2^-$  with  $\text{N}_2\text{H}_4\text{H}_2\text{SO}_4$ , the excess  $\text{N}_2\text{H}_4$  removed with  $\text{Me}_2\text{CO}$ , and  $\text{NO}_2^-$  detd. photometrically after reaction with sulfanilic acid and  $\alpha$ -naphthylamine.  $\text{H}_2\text{S}$ ,  $\text{CN}^-$ , and  $\text{NH}_3$  interfere with the detn.

A 12586 02170, 03120, 04009; 03107  
Meteorological Office  
THE MEASUREMENTS OF UPPER WINDS BY MEANS OF PILOT BALLOONS (Met. O. 804)  
London: H.M.S.O., 4th ed., 1968, 37 pp., price 4s6d; SBN 11 400341 7.  
(P 12/06)

Topics covered include methods for determining the height of the balloon (single-theodolite, tail, and double-theodolite) and the equipment used (care, handling, and maintenance).

### 3. Identification and measurement

A 12587 02613, 03169, 03330, 03627, 03658  
Pfefferkorn, G. and Blaschke, H.

APPLICATION OF SCANNING ELECTRON MICROSCOPY TO THE ASSESSMENT OF DUST SURFACES  
(EINSATZ DER RASTER-ELEKTRONENMIKROSKOPIE FÜR DIE BEURTEILUNG VON STAUBOBER-  
FLÄCHEN). (In German; English summary)

Staub, Nov. 1968, vol. 28, 440-444, 6 refs. (L)

Some illustrated examples show possibilities and limitations of applying the raster electron microscope for the description of dust surfaces. The explanation of the operating principle gives data required for understanding the contrast conditions of raster microscope pictures. Reference is made to silica dust and smoke electron micrographs.

A 12588 02320, 02333, 02977, 03120, 03136, 03312  
Proepper, G.

BRIEF DESCRIPTION OF MODEL AK DRAEGER CO METER (In German)  
(CA)

Draeger-Hefte 1967, No. 267, 38-40

CO in the air introduced through the membrane pump is catalytically oxidized to CO<sub>2</sub>. The thermobattery surrounding the reaction cartridge yields a thermovoltage acting on an amplifier. As soon as the set concn. is exceeded an optical and acoustical signal is operated.

A 12589 02681, 03120, 03777, 03780  
Schneider, W.

SIMPLE METHODS FOR DETERMINING SULPHUR DIOXIDE AND SULPHUR TRIOXIDE IN FLUE  
GASES (In German)

(CA) *Energietechnik* 1968, 17(12), 543-6. Of the many processes proposed for detg. SO<sub>2</sub> and SO<sub>3</sub> in gases, 3 were selected on the basis of simplicity of the testing and anal. procedures, viz., the Corbett, Flint process (CA 46: 237; 42: 4005f) which uses 80% iso-PrOH to absorb SO<sub>2</sub>, the Goksoeyr and Ross method (CA 57: 3694a) which condenses out the SO<sub>3</sub>, and the Christov technique (1963) which uses a NaCl-filled absorption tube to filter out the SO<sub>3</sub>. The anal. trains used for running test gas compus. by each method are compared, as are results obtained with test mixts. contg. 0-0.3% SO<sub>2</sub>, 0-600 ppm. SO<sub>3</sub> and 5-15% water vapor. Only the Goksoeyr and Ross method was suitable for detg. SO<sub>3</sub> in flue gas, which contains up to 0.03% SO<sub>2</sub> and 0.3% SO<sub>3</sub>. The Christov technique merits use in orientation studies owing to its simplicity. The Corbett, Flint process, on the other hand, does not give results which justify the comparatively expensive equipment and anal., and SO<sub>4</sub><sup>2-</sup> interferes. The simultaneous detn. of SO<sub>2</sub> and SO<sub>3</sub>

A 12589 (contd)

by absorption into 3% H<sub>2</sub>O<sub>2</sub> (Flint, *loc. cit.*) and subsequent acidimetric titrn. appears satisfactory inasmuch as the method works well when combined with either the Goksoeyr and Ross or the Christov technique.

A 12590 02022, 02030, 02520, 03240, 03330, 03331, 03427  
Sieh, R.H.W.

A NOVEL METHOD FOR DETERMINING THE SURFACE AREA, PORE VOLUME AND PORE RADIUS  
OF FINELY DIVIDED MATERIALS. (EIN NEUES MESSVERFAHREN ZUR BESTIMMUNG DER  
OBERFLÄCHENGROSSE, DES PORENVOLUMENS UND DER PORENRADIEN FEINTEILIGER  
SUBSTANZEN). (In German; English summary)

Staub, Nov. 1968, vol. 28, 480-484, 8 refs. (L)

A simplified and rapid measurement technique for recording complete adsorption-and desorption-isotherms is described. From these determinations of the surface area, porevolumen and pore-size-distribution curves can be estimated. The apparatus is based on the volumetric principle, while nitrogen is used as adsorbate gas at 78°K.

### 3. Identification and measurement

A 12591

02030, 02199, 02205, 02372, 02386, 02892, 05800

Stanley, T.W., Morgan, M.J. and Grisby, E.M.

APPLICATION OF A RAPID THIN-LAYER CHROMATOGRAPHIC PROCEDURE TO THE DETERMINATION OF BENZO(a)PYRENE, BENZ(c)ACRIDINE, AND 7H-BENZ(de)ANTHRACEN-7-ONE IN AIRBORNE PARTICULATES FROM MANY AMERICAN CITIES

Envir. Sci. Technol., Sept. 1968, vol. 2, 699-702, 11 refs. (L)

Airborne particulates from more than 50 U. S. cities contain the three polynuclear hydrocarbons—benzo(a)pyrene, benz(c)acridine, and 7H-benz(de)anthracen-7-one. Analyses were obtained with a one-dimensional chromatographic procedure using thin layers of alumina mixed with silica gel. Concentrations of benzo(a)pyrene range from 02 to 18  $\mu$ g/1000 m.<sup>3</sup> of air; concentrations of benz(c)acridine range from 0 to 1.5  $\mu$ g/1000 m.<sup>3</sup>; and concentrations of 7H-benz(de)anthracen-7-one range from 1 to 13  $\mu$ g/1000 m.<sup>3</sup> of air.

A 12592

03709, 03880

Vasak, V.

ATOMIC ABSORPTION SPECTROPHOTOMETRY AND ITS USE IN INDUSTRIAL TOXICOLOGY  
(In Czech)

(CA)

*Cesk. Hyg.* 1968, 13(2), 105-10. A review  
on the possibilities and limitations of the method.

A 12593

02002, 02114, 02150, 03192

Zweibaum, F. and Moorhead, J.

A MULTI-ELEMENT ATOMIC ABSORPTION ANALYSER

(CA)

*At. Absorption Newsletter* 1967, 6(6), 134 (Eng). An app. modified for simultaneous detn. of 4 selected elements was described. The system was designed for continuous monitoring of several elements concd. from the atm. into a small vol. air stream. The air stream is fed directly and continuously into the burner nebulizer. The app. has been successfully tested with Bi, Ni, Li, and Li. Standard liq. samples (in river or industrial facilities) can be continuously monitored.

See also: A 12569, A 12597, A 12598, A 12599, A 12603, A 12609, A 12620,  
A 12636

## 4. Distribution (surveys, chimney heights, meteorology)

A 12594 03443, 03728, 05820  
Anon.

POWER UTILITIES: Giant Stack at M.W. Kellogg Co.'s Conemaugh Plant  
J. Air Pollut. Control Ass., Sept. 1968, 620. (L)

Although a 1205-foot-tall chimney now is under construction in Cresap, W. Va., for Appalachian Power Co., no other chimney in the world can presently top the 1000-foot-tall stack which was completed in drizzling rain during the early morning hours of June 28, 1968, for the Conemaugh Owners Group, a joint undertaking of nine power utilities.

The giant stack is one of two 1000-footers being erected at the Conemaugh Plant by The M. W. Kellogg Co., a division of Pullman Incorporated. In 1970, the first of two 600,000-kilowatt electric generating units, served by the just-topped chimney, will go into operation. A second, with another 1000-foot stack, will begin operating in 1971. Gilbert Associates, Inc., Reading, Pa., is architect/engineer.

A 12594

Previously, most power station stacks were 400 feet or less. In the middle-1950's, a few stacks in the range of 700 feet began to appear, but it was not until the 60's that tall stacks began to rise on the horizon. Prior to this Conemaugh installation, the tallest were still in the range of 750-850 feet.

A 12595 02320, 02386, 02392, 03920, 04009, 05050; 03799  
Dirmhirn, I.

LOCAL CLIMATIC MEASUREMENTS IN VIENNA

Biometeorology, vol. 2, part 2, n. 598-600, (Proceedings of the Third International Biometeorological Congress, 1-7 Sept. 1963), Pergamon Press, Oxford (etc.), 1967.

A brief review of studies made of the urban climate of Vienna is given. This review shows that the climate of this city has been explored more extensively than most cities, and investigations in other areas could well draw on the experience accumulated in Vienna. Studies carried out within the last three years include the measurements of CO-concentration in the air and of the turbidity in the town.

A 12596 02030, 02035, 02214, 03331, 03500, 03599, 03665  
Dufour, L.

ATMOSPHERIC AEROSOLS (In French)

(CA)

Ciel Terre 1967,  
83(9-10), 269-317. Atm. aerosols are reviewed with respect to their formation, compn., size distribution near the surface, height, coagulation, and their removal by sedimentation and washing by rain or snow. 117 references.

## 4. Distribution (surveys, chimney heights, meteorology)

A 12597 02056, 02150, 02320, 02353, 02386, 02399, 02614, 02788,  
02964, 03201, 03276, 03358, 03443, 03526, 04009, 05800  
Jaffe, L.S.

AMBIENT CARBON MONOXIDE AND ITS FATE IN THE ATMOSPHERE

J. Air Pollut. Control Ass., Aug. 1968, vol. 18, 534-540, 39 refs. (L)

Carbon monoxide, the most abundant air pollutant found in the atmosphere, generally exceeds that of all other pollutants combined (excluding CO<sub>2</sub>). It is estimated that over 37 x 10<sup>6</sup> tons of CO was emitted in the United States from major technological sources alone during 1966. More than 90% of the total CO emitted from fossil fuels is derived from gasoline powered motor vehicles. Other sources of CO include emissions from coal and fuel oil burning, aircraft, and open burning. Some CO is also formed by certain vegetation and marine invertebrates (siphonophores). Chemical reactions of CO in the upper and lower atmosphere are discussed:

(contd.)

A 12597  
(contd.)

oxidation of CO in the lower atmosphere by molecular oxygen is very slow. The exact duration of CO in the lower atmosphere is not known with certainty; however, the mean residence time has been variously estimated to be between 0.3 and 5.0 years. In the absence of scavenging processes the estimated world-wide CO emission would be sufficient to raise the atmospheric level by 0.03 ppm per year, yet the background levels of CO in clean air do not appear to be increasing. Several potential sinks are discussed. The mechanism of the process of CO removal from the lower atmosphere is at the present time not well understood.

A 12598 02028, 02030, 02040, 02386, 02425, 02586, 02786,  
02816, 02997, 03046, 03358, 03735, 03770, 03777, 03951,  
McMullen, T.B. et al. 05800

AIR QUALITY AND CHARACTERISTIC COMMUNITY PARAMETERS

J. Air Pollut. Control Ass., Aug. 1968, vol. 18, 545-549, 22 refs. (L)

Statistical correlations between all pairs of 16 selected air quality measurements and 13 selected community parameters for 66 standard metropolitan statistical areas have been calculated, tested for significance, and reviewed for meaningful relationships. Of special interest are the correlations between the sulphate fraction of suspended particulate matter and the use of sulphur-containing fuels, between ambient sulphur dioxide and the use of sulphur-containing fuels, between the lead fraction of suspended particulates and annual purchases of petrol, and between vanadium in suspended particulates and the percent

(contd.)

## 4. Distribution

### (surveys, chimney heights, meteorology)

**A 12598**

(contd.)

residual fuel oil used in community. Several of these relationships are given more definitive description with mathematical equations that indicate how the ambient pollutant concentration varies as a function of a related community parameter. The geographic distribution of high and low pollutant levels is also discussed.

**A 12599** 02164, 02316, 02426, 03135, 03184, 03490, 04009  
Neely, J.E.

MODELS FOR THE ANALYSIS OF CYANO VIOLET RADIATION BEHIND SHOCK WAVES IN AIR CONTAMINATED WITH CARBON-BEARING COMPOUNDS (CA)

*NASA* (Nat. Aeronaut. Space Admir.),  
Tech. Note 1967, TND-3935, 25 pp. Two approaches were employed: (1) a simple chem. system was set up for a known contaminant, C<sub>3</sub>N<sub>3</sub>, and (2) a computer program that utilized a free energy technique was used to evaluate the CN radical concn. for given at. percents of C. Contaminated air in the velocity range 6.10-9.14 mm./usec. may be dominated by small contamination levels. At speeds >10.06 mm./usec., higher levels can be tolerated. Calcns. for nonequil. conditions indicate that the ratio of CN radiation to radiation from air in the chem. relaxation zone is comparable to the ratio for the equil. condition.

**A 12600** 02040, 02162, 02386, 02494, 02552, 03331, 03818, 03876,  
03882, 03947, 04009, 04014, 02988

Smith, D.B.

TRACER STUDY IN AN URBAN VALLEY

J. Air Pollut. Control Ass., Sept. 1968, vol. 18, 600-604, 8 refs. (L)

Results of a series of night-time tracer experiments conducted during the Autumn of 1966 in the industrialized valley of Johnstown, Pa., are discussed. Quite atypical meteorology and dispersion occur within a classical drainage flow framework. An urban heat island effect is observed creating uniform temperature and wind structures within a layer of air flowing through the valley. Dispersion in the valley at night is comparable to that of neutral conditions over open country.

**A 12601** 02049, 03658, 03777, 05340  
South Africa National Physical Research Laboratory  
A WATCHFUL EYE ON AIR POLLUTION  
(APCA)

Sciences 9 (3),

16-17 (Mar. 1968). Since 1965 the National Physical Research Laboratory has measured the concentrations of smoke and SO<sub>2</sub> on Church Square, Pretoria. The monthly average of smoke in the atmosphere above Pretoria through 11 years is presented graphically.

## 4. Distribution (surveys, chimney heights, meteorology)

A 12602

02121, 02204, 02205, 02311, 02386, 02456, 02648, 03069,  
03658, 03783, 03871, 04014, 05150, 05215, 05290, 05661;  
Waller, R.E. and Commins, B.T. 02500, 02914

STUDIES OF THE SMOKE AND POLYCYCLIC AROMATIC HYDROCARBON CONTENT OF THE AIR IN  
LARGE URBAN AREAS

Envir. Res., Dec. 1967, vol. 1, (4), 295-306, 14 refs. (L)

This paper describes the techniques used to assess average concentrations of smoke and polycyclic hydrocarbons in four cities in Europe (Belfast, Dublin, Oslo, and Helsinki) having populations of about half a million each. The work formed part of an international study of air pollution, smoking habits, and occupation in relation to lung cancer mortality. Concentrations of the pollutants measured were found to be higher in Belfast than in Dublin and higher in Oslo than in Helsinki. The relevance of these results to the recently published epidemiological findings has been discussed. It was considered that changes in the amounts of pollution in each city in recent years made it difficult to assess past exposures on the basis of current concentrations.

A 12603

02030, 02995, 03104, 05910

Wiley, R.H. and Proelss, H.

MANGANESE ESR SIGNAL IN AIR-PARTICULATE SAMPLES

Envir. Sci. Technol., Sept. 1968, vol. 2, 705, 7 refs. (L)

Manganese ion has been found in particulate samples from New York City. Its presence was observed by an electric spin resonance signal characteristic of the manganese ion. The presence of manganese ion is attributable to the presence of oxidizable carbon and nitrogen compounds.

A 12604

02427, 02683, 02692, 03268, 03536, 03760, 03855

Zur Muehlen, T.

GAS CHROMATOGRAPHIC MEASUREMENTS OF STYRENE EMISSIONS AND IMMISSIONS

(In German)

(CA)

*Zentralbl. Arbeitsmed. Arbeits-*  
*schutz* 1968, 18(2), 41-3. Nuisance complaints around a polyester resin manufg. plant occasioned a survey for styrene, yielding the following atm. concn. figures: general av. level in workroom 10-30; directly under exhaust fan (operated at 4-6 m.<sup>3</sup>/sec.) 700-1000; outside building at exhaust discharge 340; 1 m. away from latter 130; 10 m. away (downwind) 8-9; 35 m. away (downwind) 1 ppm.; at greater distances sporadic "clouds" of 1 ppm. The odor threshold is exptl. demonstrated to be 1 ppm.

See also: A 12569, A 12586, A 12607, A 12620, A 12654

## 5. Effects on humans, animals, vegetation, etc

A 12605 02246, 02914, 03089, 03241, 03777  
Abe, M.

EFFECTS OF MIXED NITROGEN DIOXIDE-SULPHUR DIOXIDE ON HUMAN PULMONARY  
FUNCTIONS. EFFECTS OF AIR POLLUTION ON THE HUMAN BODY  
(CA)

*Bull. Tokyo Med. Dent. Univ.*  
1967, 14(4), 415-33 (Eng). Inhalation of 4-5 ppm. SO<sub>2</sub> or NO<sub>2</sub> increased respiratory difficulties. This effect with SO<sub>2</sub> appeared in shorter time than that of NO<sub>2</sub>.

A 12606 02030, 02462, 02523, 02615, 02691, 02777, 02964, 03061,  
03569, 03932, 03975

Brysson, R.J., Frask, B.J. and Cooper, A.B.  
THE DURABILITY OF COTTON TEXTILES. THE EFFECTS OF EXPOSURE IN CONTAMINATED  
ATMOSPHERES  
(APCA)

*Amer. Dyestuff Repr.* 57

(14), 15(512)-20(517) (July 1, 1968).

The durability of exposed cotton textiles is influenced by the ambient air quality as well as the aggregate effect of sunlight, humidity, and micro-organisms. This report describes the exposure of cotton fabrics at sites of widely varying atmospheric contamination and paralleling laboratory studies with artificially contaminated fabrics. The outdoor exposure sites ranged from heavy industrial (high contamination) to essentially rural (low contamination). The laboratory studies included artificial contamination of fabric samples and exposure to ultraviolet and visible light. The data include strength retention, degree of soiling, selected sample pH measurements, and cellulose fluidities together with air contamination data as determined by periodic measurement of dustfall, suspended particulate matter and sulfur dioxide content. The outdoor data

(contd)

A 12606 (contd)

definitely establish a relationship between atmospheric contamination and accelerated degradation of cotton fabrics. The laboratory data indicate the role of light in accelerating the degradation of contaminated cotton fabrics.

A 12607 02049, 02158, 03658, 03739, 03777, 05643  
Chandler, K.A. and Kilcullen, M.B.

CORROSION AND ATMOSPHERIC POLLUTION IN AND AROUND SHEFFIELD

(CA)

*Brit. Corros. J.* 1968,  
3 (2), 80-4 (Eng). Data are presented on the nature and extent of the relations between the corrosion of a 0.057C-0.06% Cu and a 0.20C-0.28% Cu steel and atm. pollution at 23 selected sites in the Sheffield area; exposure was for 1 year and correlations were made with SO<sub>2</sub> and smoke concns. while the amt. of adherent rust and SO<sub>4</sub><sup>2-</sup> contents were also measured. Atm. SO<sub>2</sub> and smoke pollution had a major influence on steel corrosion rate, accounting for 50% of the variations found at different sites. Other factors of equal importance included the total time the steel was wetted. Smoke intensity was as important as SO<sub>2</sub> concn. as regards corrosion rate, but the correlation between SO<sub>2</sub> and smoke concn. was high. However, prediction of corrosion rate from SO<sub>2</sub> and smoke concns. was difficult, since other unspecified factors had to be included. The range of corrosion rates covered 1.3-3.5 mils/year and 1.2-2.4 mils/year for steels A and B, resp.; the improvement in corrosion rate obtained by increasing alloy content is given by the expression  $y = 1.86x - 0.81$  where  $y$  = corrosion rate of the steel with 0.06% Cu and  $x$  = that with 0.28% Cu. 6 references.

A 12608 02399, 02914, 03283, 03880

Parhi, Morel, and Cavigneaux  
TOXICOLOGICAL NOTE: METHYLENE CHLORIDE. (In French)

(CA)

*Double*

*Liaison* 1968, No. 151, 303-6. The chem. and phys. properties of CH<sub>2</sub>Cl<sub>2</sub> and its toxic effects on man are reviewed and recommendations for storage and handling of the compd. in industry are made.

## 5. Effects on humans, animals, vegetation, etc

A 12609 02028, 02040, 02166, 02413, 03880; 02682, 03201, 03272,  
Fishlock, D. 03315

PORTON'S "OPEN AIR FACTOR" KILLS GERMS  
Fin. Times, 21 Oct. 1968, 11. (L)

**POLLUTED AIR** is bactericidal—fatal to germs—scientists with the Ministry of Defence's Microbiological Research Establishment at Porton have concluded.

Exactly what it is that kills the micro-organisms the Porton scientists are still unsure, for the substance is present in extremely small quantities, less than one part in a hundred million parts of air.

The open air factor was discovered by using a micro-miniature version of the screens used, in Gibraltar for example, in experiments to condense fresh water directly from clouds. In this case, however, the clouds were extremely fine dispersions of liquid droplets in air, known as aerosols.

Spiders provided the micro-thread

used to wind screens developed by May and H. A. Druett. Wound round a small wire frame, the spider's "escape line," only a micron in diameter, affords a screen fine enough to capture bacteria, which are strung like beads along the thread. It has proved a very sensitive means of measuring pollution in air.

Although so far they have been unable to verify it, the team has a hypothesis that the open-air factor may be a chemical compound of ozone, and a hydrocarbon. Compounds of ozone and such olefins as pentene, hexene, heptene and octene have been shown at Porton to be powerfully bactericidal.

The Porton scientists have calculated that it requires about 20 tons of hydrocarbons an hour in the air

(contd)

A 12609 (contd)

over Britain, given winds averaging 10 m.p.h., to produce the bactericidal conditions they have measured at night. Britain's vehicles, they believe, exhaust about 26 tons of unburned fuel an hour.

A 12610 03555, 03760, 03880  
Gut, I.

BEHAVIOURAL EFFECTS OF STYRENE IN RATS (In Czech)  
(CA)

*Activ. Nerv.*

Super. 1968, 10(1), 22-30. The min. atm. styrene concn. inhibiting spontaneous motor activity (SMA) of rats after a single exposure was 1380 mg./m.<sup>3</sup>; it increased with repeated daily exposures to  $\geq 4240$  mg./m.<sup>3</sup>. The inhibitory effect was more pronounced in rats selected for high basal metabolism than in rats with low basal activity, perhaps because of a lower respiratory vol./min. in the latter group. 10 references.

A 12611 02311, 02425, 02688, 02914, 03490, 03880; 02768, 03118  
Hermann, E.R.

THRESHOLD PREDICTION AND CHARACTERISTICS OF LOG-NORMAL PHENOMENA  
Environ. Res., Dec. 1967, vol. 1, (4), 359-369, 7 refs. (L)

The measurements of many phenomena of interest in environmental health may be distributed in a log-normal manner. The zero point of occurrence of such phenomena is of considerable importance. A simple equation is derived for determining the point of origin of a log-normal frequency distribution. Statistical methods for analyzing data sets and applying the equation are presented for three general cases; namely, (1) distributions in which the origin and zero reference of measurement coincide, (2) distributions in which the origin and zero reference of measurement do not coincide, and (3) distributions in which the parameter of measurement is a log function, and has an arbitrarily selected positive value for its reference point which is relative, not absolute.

It is anticipated that the procedures presented will find applications in the analysis of data arising from research into toxicology, radiation exposure, physical or chemical stimulus responses in biological or psychophysical systems, carcinogenesis, particle kinetics and other phenomena yielding log-normal data sets.

## 5. Effects on humans, animals, vegetation, etc

A 12612 02090, 02194, 03118, 03555

Kulakov, A.E.

PERMISSIBLE CONCENTRATION OF HEXAMETHYLENEDIAMINE IN THE AIR IN POPULATED AREAS (in Russian)  
(CA)

*Biol. Deistvie Gig. Znachenie Atmos. Zagryaznenii 1967, No. 10, 15-32.* Four groups of 15 white female rats were kept in air with 1, 0.04, 0.001 mg./m.<sup>3</sup> and no hexamethylenediamine for 3 months. The animals were observed 1 month before and after the exposure. One mg./m.<sup>3</sup> caused changes in the blood indexes, disturbed motor responses and pathol. changes of inner organs; 0.04 mg./m.<sup>3</sup> gave the same effects to a lesser degree; 0.001 mg./m.<sup>3</sup> had no detectable effect, and is proposed as the max. daily mean.

A 12613 02229, 03131, 03555

Magos, L.

MERCURY-BLOOD INTERACTION AND MERCURY UPTAKE BY THE BRAIN AFTER VAPOUR EXPOSURE

*Envir. Res., Dec. 1967, vol. 1, (4), 323-337, 13 refs. (L)*

On the wet weight basis the mercury uptake by the brains of mice exposed to 0.033-0.900  $\mu$ g mercury/liter of air for 4-hours was little more than two thirds of the total uptake (inhalation plus absorption by fur). This high quotient suggests that the major part of mercury equilibrated in a highly diffusible form between the blood and the tissues including the brain.

The independent behavior of individual doses of mercury first reported by Rothstein and Hayes was confirmed. There was no difference in the distribution of  $^{203}\text{Hg}$  between mice exposed once and those exposed four times if in the latter cases mercury was labeled only in the first instance.

A 12614 02201, 02229, 02246, 03880, 03944

Pavlenko, S.M.

EXPERIMENTAL-TOXICOLOGICAL MATERIALS FOR STUDYING THE COMPLEX ACTION OF CHEMICAL AGENTS SIMULTANEOUSLY CONTAMINATING WATER AND AIR (in Russian)

(CA) *Prom. Zagryazneniya Vodochr. 1967, No. 8, 260-71.* Expts. with single introductions of  $\text{C}_6\text{H}_6$  (I) orally and by inhalation showed that the toxicity of I varies as a function of the order of introduction and the time elapsed from the moment of introduction. The greatest toxicity was observed when I was first introduced orally and then by inhalation at an interval of 30 min. A 0.025 mg./kg. dose of I may be regarded as inactive during a chronic 6-month expt. by oral introduction. The permissible concn. of I (0.5 mg./l.) in the reservoir water established earlier was confirmed. A concn. of 0.01 mg./l. of I may be considered inactive during inhalation. During the complex action of I, orally and by inhalation at the level of the threshold dose (0.25 mg./kg. + 0.02 mg./l., resp.), a definite action on the central nervous system, on blood (variation in the leukocytes), and on the content of vitamins in blood and urine was observed. During the complex action of I at a dose of 0.025 mg./kg. and at a concn. of 0.01 mg./l. (at the level of the limiting permissible concns.) there appeared functional destructions in the central nervous

(contd)

A 12614

(contd)

system, a variation in the content of vitamins in urine, and also a variation in the total and albuminous mercapto groups in the blood serum at the level of the action threshold. During the complex action of I at a dose of 0.0125 mg./kg. and a concn. of 0.005 mg./l. at the level of half of the limiting permissible concns. in chronic expts., no variations were observed according to any of the parameters studied. During the complex action, a 0.0125 mg./kg. dose and a 0.005 mg./l. concn. (half of the limiting permissible concns.) may be considered as inactive.

## 5. Effects on humans, animals, vegetation, etc

A 12615 02494, 03118, 03553, 03953  
Pazynich, V.M.

### THE AVERAGE DAILY PERMISSIBLE CONCENTRATION OF VANADIUM PENTOXIDE IN THE ATMOSPHERE (In Russian)

(CA) *Biol. Deistvie*  
*Gig. Znachenie Atmos. Zagryaznenii* 1967, No. 10, 201-17.  
V<sub>2</sub>O<sub>5</sub>, 0.27 mg./m.<sup>3</sup> in chronic continuous treatment of rats for 70 days produced basic functional, and also morphological changes in some internal organs. Continuous 40-day treatment with 0.006 mg./m.<sup>3</sup> also resulted in some functional changes which were considerably exacerbated during starvation 3.5 days later; 0.002 mg./m.<sup>3</sup> is recommended as the av. daily permissible concen.

A 12616 02278; 02690, 02914; 02494, 03089, 03118, 03553; 03268,  
Ripp, O.K. 03855

### HYGIENIC BASIS FOR THE PERMISSIBLE CONCENTRATION OF BUTADIENE IN THE ATMOSPHERE (In Russian)

(CA) *Biol. Deistvie Gig. Znachenie Atmos. Zagryaznenii* 1967, No. 10, 33-54. The odor threshold value was established at 4 mg./m.<sup>3</sup> butadiene in air. Increased sensitivity of the human eye was found at 4 mg./m.<sup>3</sup>, and not at 3.6 mg./m.<sup>3</sup>. Electroencephalograms showed an effect by concens. of 3 mg./m.<sup>3</sup>. The upper limit for a single exposure is proposed to be 3 mg./m.<sup>3</sup>. Female white rats were exposed for 81 days to 0, 1.03 ± 0.006, 3.08 ± 0.006, and 30.8 ± 0.075 mg./m.<sup>3</sup>. Wt., blood, cholinesterase activity, arterial pressure, and motor activity were studied. Only the 30-mg. group showed significant departure from normality. Pathol. examn. showed some effect by the concen. of 3 mg./m.<sup>3</sup> on the epithelium of the mucous membranes of the lungs and noses. As an upper limit a concen. of 1 mg./m.<sup>3</sup> (daily mean) is proposed.

A 12617 02914, 02929, 03118, 03268, 03535  
Sedilova, M.S.

### THE PERMISSIBLE CONCENTRATION OF HYDROGEN FLUORIDE IN THE AIR IN POPULATED AREAS (In Russian)

(CA) *Biol. Deistvie Gig. Znachenie Atmos. Zagryaznenii* 1967, No. 10, 186-201. The HF olfactory and reflex threshold, established by the method of human dark adaptation, was 0.03 mg./m.<sup>3</sup>. A 5-month treatment with HF at 0.10 and 0.03 mg./m.<sup>3</sup> produced central nervous system inhibition, with irreversible nerve cell destruction at the higher concen., impairment of metabolism, accumulation of F in the bones, and histomorphological changes in the teeth, bones, and internal organs. The observed changes were related to atm. HF concen. No observable effects were produced at 0.01 mg. HF/m.<sup>3</sup>. The max. permissible concen. for a single exposure is recommended as <0.03, and should not exceed 0.02; the av. daily exposure should not exceed 0.01 mg. of HF/m.<sup>3</sup>.

A 12618 02214, 02914, 03046  
Schwancke, R.

### ACCIDENTS AND HEALTH HAZARDS CAUSED BY ANTIKNOCK AGENTS BASED ON ORGANOLEAD COMPOUNDS. (In German)

(CA) *Zentralbl. Arbeitsmed. Arbeitsschutz* 1968, 18 (3), 69-78  
(Ger). A discussion with 20 references.

A 12619 02263, 02443, 02613, 02690, 02914, 03089, 03177, 03814  
Szczeklik, E. et al.

### THE EFFECT OF DUST ON THE HEALTH OF WORKERS AT THE TUROW MINING-POWER STATION COMBINE (In Polish)

(CA) *Postepy Hig. Med.*  
*Dosw.* 1967, 21(6), 885-924. Chem. anal. of numerous dust samples showed the absence of poisonous or radioactive components. No effect on the physiol. functioning of the thyroid, liver, or circulatory system could be established. The frequent appearance of conjunctivitis was related to the presence of dust; frequent incidence of bronchitis was probably due to a decrease in the lung capacity of the exposed subjects. Pneumoconiosis was not detected but dental caries were quite common and so was eosinophilia. 25 references.

## 5. Effects on humans, animals, vegetation, etc

A 12620 02449, 03046, 03120, 03264, 03642, 05251  
Tamura, T. et al.

### THE QUANTITY OF COPPER AND LEAD ON THE SURFACE OF HUMAN SKIN (In Japanese) (CA)

*Tokyo Ritsu Eisei Kenkyusho Nenpu* 1966, 18, 219-25.  
The title detn. involved wiping  $\sim$ 100 cm.<sup>2</sup> area of the left and right forearm with 0.7 g. cotton impregnated with 2 ml. of 5% triethanolamine soln. The cotton was then extd. with N HCl at 60°, and Cu and Pb were detd. resp. by the diethyldithiocarbamic acid method and dithizone method. Detns. on  $\sim$ 400 residents in Tokyo gave mean values of Cu and Pb of 3.38 and 2.47  $\gamma$ , resp. for males and 1.78 and 1.14  $\gamma$ , resp. for females. In both sexes these values were higher in younger groups than in the older groups. In workers engaged in the manuf. of Pb products, Cu and Pb were 4 and 32.8  $\gamma$ , resp.

A 12621 02049, 02617, 02641, 02691  
U.S. Department of Health, Education, and Welfare

### (\\$41,000 CONTRACT TO UNIVERSITY OF NORTH CAROLINA FOR NATIONWIDE SURVEY OF AIR POLLUTION EFFECTS ON TEXTILE MATERIALS)

J. Air Pollut. Control Ass., Sept. 1968, 624. (L)

The first phase of the survey will identify and document the effects of air pollution on textile materials and commercial dyes used to color textile products. A second phase will consist of an economic assessment of the annual cost to the United States of the effects identified in the first phase.

Dr. Victor S. Salvin, of the University's School of Home Economics, has been named project director.

A 12622 02677, 03880, 03881; 02690, 02914, 03118, 03555; 03268,  
Tuldashev, T. 03855

### TOXICITY OF TRACE CONCENTRATIONS OF ETHYLENE OXIDE (In Russian) (CA)

*Biol. Drustvie Gig. Znachenie Atmos. Zagryaznenii* 1967, No. 10, 54-64. The odor threshold value was established as the value found by the 2 most sensitive persons out of 20 as 1.5 mg./m.<sup>3</sup> (the limit ranged 1.5-6.6 mg./m.<sup>3</sup>). The limit of sensitivity of the human eye was found to be 0.5-1.0 mg./m.<sup>3</sup>. The limit for electroencephalograms was found at 0.65 mg./m.<sup>3</sup>. Four groups of 15 female white rats were exposed to ethylene oxide concns. in air 0.3, 0.03, 0.01 and 0 mg./m.<sup>3</sup> for 83 days. Cl and N in the blood and changes in the protein fraction of blood-serum were observed. Morphological and histological examsns. were made at the end of the exposure to ethylene oxide. Changes in Cl and N were found in the group exposed to concns. contg. 0.3 mg./m.<sup>3</sup>. The other groups did not reveal any changes; 0.03 mg./m.<sup>3</sup> is proposed as upper limit for mean daily concn. of ethylene oxide in air.

See also: A 12568, A 12569, A 12570, A 12592, A 12602, A 12640

## 6. Administration (programmes, standards, legislation)

**A 12623** 02043, 02461, 02964, 03739  
American Iron and Steel Institute  
(\$222,000,000 FOR FACILITIES TO PROVIDE CLEANER AIR AND WATER)  
J. Air Pollut. Control Ass., Sept. 1968, 625. (L)

A survey by American Iron and Steel Institute has disclosed that steel companies have committed themselves to capital costs of that magnitude in the interest of improving the quality of the nation's environment.

Facilities to be placed in operation during 1968 or later, for which expenditures have been authorized, include \$120,000,000 for cleaner water and \$102,000,000 for air controls.

The survey also disclosed that the industry's expenditures in 1967 for pollution control facilities were up 67 percent—to \$94,100,000 from \$56,500,000

in the preceding year. Outlays included \$54,700,000 spent for cleaner water (vs. \$18,800,000 in 1966) and \$39,400,000 for air pollution control (vs. \$37,700,000 in 1966). The Institute's figures do not include operating expenses, such as maintenance and power costs and operating labor costs.

Eighty-three companies, accounting for nearly 98 percent of raw steel production, participated in the Institute survey.

**A 12624** 02044, 02386, 02552, 03184, 05800  
Gaulding, C.L.  
DEFINITION OF AIR QUALITY CONTROL REGIONS: APPROACH AND EXPERIENCE TO DATE  
J. Air Pollut. Control Ass., Sept. 1968, vol. 18, 591-595. (L)

Section 107. (a) (2) of the Clean Air Act, as amended by the Air Quality Act of 1967, directs the Secretary, HEW, to designate Air Quality Control Regions for the purpose of establishing ambient air quality standards required in subsequent sections of the Act.

This paper gives a status report on the steps taken by the National Air Pollution Control Administration to implement this Section in the 7 months since the Air Quality Act was signed. It discusses the procedural aspects of the Administration's approach, emphasizing Administration's policy and the involvement of state and local entities in the development of region designations. The designation of Air Quality Control Regions is related to other steps  
(contd)

**A 12624** (contd)  
required by the Act, especially those involving state and local governments.

**A 12625** 02043, 02461, 02964, 05800  
McKee, H.C.  
PREFERENTIAL TAX TREATMENT FOR POLLUTION CONTROL EXPENDITURES: ENGINEERING CONSIDERATIONS  
J. Air Pollut. Control Ass., Sept. 1968, 596-599. (L)

Preferential tax treatment has been advocated as a means of reducing the cost to industries for installation of air and water pollution control equipment, and several states have already adopted such tax rates.

Most of the present or proposed laws apply only to filters, scrubbers, precipitators, and other supplementary devices for pollution control, but do not apply to process modifications which prevent pollution problems and make such supplementary devices unnecessary. Therefore, the long-term effect of preferential tax rates may be to increase the total cost of producing various manu-

(contd)

## 6. Administration (programmes, standards, legislation)

A 12625 (contd)

factured items. Such rates may also act to subsidize process changes which enhance a company's competitive position in the industry. Such rates may also be undesirable from the standpoint of conserving natural resources. Specific examples are given to illustrate these considerations.

A 12626 02042, 03526, 05880

Metzler, D.F.

MANAGING ENVIRONMENTAL QUALITY

Dangerous Properties of Industrial Materials, 3rd edn., Reinhold Book Corp., New York (etc.), 1968, 77-108, 9 refs. (L)

The bulk of this part of the book is concerned with water pollution and its control; there is also presented, on p. 89-99, a list of air pollution, as well as water pollution, agencies, and of agencies responsible for solid wastes planning, in the U.S., arranged by State in alphabetical order.

A 12627 02048, 02682, 03201, 03731, 03955, 05810  
U.S. California Air Resources Board

CONTROL DISTRICT NEWS

J. Air Pollut. Control Ass., Sept. 1968, vol. 18, 623. (L)

Praise and protest were voiced by California Air Resources Board Chairman Dr. A. J. Haagen-Smit over the waiver from the U. S. Department of Health, Education, and Welfare, for 1960 exhaust standards and 1970 evaporative loss standards for new automobiles. Chairman Haagen-Smit expressed his views at the sixth meeting of the ARB on July 17.

The problem of returning to the Federal government every time new standards and test procedures are adopted by California will prove burdensome, he declared. Much more time and effort

will be required for the preparation of documents supporting the new requests and in testifying at hearings.

One of the nation's extensive research programs on automotive air pollution was outlined to the Board by John M. Campbell, chairman of the Coordinating Research Council Air Pollution Advisory Committee.

Campbell described 32 projects, costing more than \$10 million, in which the CRC is involved, projects supported by the automotive and petroleum industries and by the Department of Health, Education, and Welfare.

A 12628 02043, 02320, 02684, 02921, 03201, 03359, 03731, 03826,  
05880

U.S. Post Office Department

(MOTOR VEHICLE POLLUTION CONTROL)

J. Air Pollut. Control Ass., Sept. 1968, vol. 18, 576-577. (L)

The Post Office Department, by Headquarters Circular No. 66-18, May 19, 1968, adopted a policy requiring that all vehicles procured after July 1, 1968 be equipped with air pollution control devices commensurate with technological advancements of the industry. Under this policy, current specifications for postal vehicles stipulate that all vehicles with rated payloads of 1-ton and less be furnished with exhaust emission control equipment capable of limiting exhaust emissions to not more than 275 ppm hydrocarbons and 1.5% by volume carbon monoxide.

Implementation of the 1966 Policy Directive, has given the Post Office Department a significant lead over the other Federal Agencies in the application of pollution control technology to motor vehicle fleet operations.

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## 6. Administration (programmes, standards, legislation)

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A 12629

02030, 02047, 02399, 02613, 05694

U.S. West Virginia Air Pollution Control Commission  
CONTROL DISTRICT NEWS: STATE OF WEST VIRGINIA (Emissions from Coal Preparation  
Plant)

J. Air Pollut. Control Ass., Sept. 1968, vol. 18, 523. (L)

"Regulation V," under consideration by the commission since a public hearing in May, was approved by a 4-to-3 vote.

The new regulation went into effect Sept. 1, and will reach full effectiveness in stages 18 months and three years after that date.

At the end of that time coal companies will be required to have equipment capable of limiting the emission of "particulate matter" such as coal dust to a range of 0.12 to 0.08 grains a minute per standard cubic foot of dry gas, depending on the size of the plant. Pollu-

tion from coal preparation plants now runs as high as six grains of matter a minute.

See also: A 12568, A 12569, A 12615, A 12616, A 12617, A 12633

## 7. Methods and equipment for abatement

A 1 2 6 3 0

02114; 02320, 02683, 02804, 03312, 03333, 03478, 03593  
Allis-Chalmers Manufacturing Co. and Harkness, A.C.

WET OXIDATION OF CARBON MONOXIDE FOR PURIFICATION OF GAS STREAMS (Patent)  
(CA)

U.S. 3,383,164 (Cl. 23-2), 14 May 1968, Appl. 02 Mar 1962-27, May 1965; 3 pp. The title process, effective at ambient temps., passes the gas through a scrubber or soln. contg. acidified (with  $\text{HClO}_4$  or  $\text{H}_2\text{SO}_4$ , pH <7) alkali permanganate which contains a catalytic amt. of  $\text{Ag}^+$  or  $\text{Hg}^{++}$ , the concn. of which can be as low as that afforded by  $\text{AgCl}$ .  $\text{Ag}^+$  is more effective than  $\text{Hg}^{++}$ . Used soln. is filtered to remove pptd.  $\text{MnO}_2$ , the  $\text{MnO}_2$  content is replenished, and the soln. is returned to the process, while the purified gas stream can be vented to the atm. The method is useful in anal. procedures or for purifying the exit gas from catalytic hydrogenation.

A 1 2 6 3 1

Anon.

REDUCING AND CONTROLLING DUST EMISSIONS FROM BITUMINOUS ROAD-CONSTRUCTION-MATERIALS MIXERS. (VERMINDERUNG UND BEGRENZUNG DES STAUBAUSWURFS BEI MISCHANLAGEN FÜR BITUMINOSE STRASSENBAUSTOFFE). (In German; English summary)

Wiss. Luft Betr., June 1968, vol. 12, 369-371, 5 refs. (L)

The nature of the emissions (dust, vapours, soot) and their control are discussed.

A 1 2 6 3 2

02043, 02048, 02320, 02682, 03201, 03358, 03359, 05530

Anon.

EXHAUST FUMES STUDY

Fin. Times, 8 Nov. 1968, 11. (L)

TWO giant British companies, British Leyland and Shell, have signed an agreement for a three-year joint study and research programme aimed at reducing potentially harmful fumes in the exhaust gases from petrol engines.

Research teams from the two companies will work together, British Leyland supplying development engines and Shell scientists building the equipment for fuel studies. This method of operation is expected to give the best chances of

success in cutting out carbon monoxide and other harmful emissions from petrol engines—hitherto the companies have worked independently on the problem.

A 1 2 6 3 3

02045, 02320, 02328, 02461, 02682, 02684, 02921, 03201, 03359, 05370

Anon.

EXHAUST CONTENT PLAN FOR SWEDISH CARS

Fin. Times, 14 Nov. 1968, 7. (L)

A PROPOSAL that all new cars from 1971 models onward should have a 40 per cent. reduction in the carbon monoxide content of exhaust gases to reduce pollution has been placed before the Swedish Parliament by the Minister of Communications, Mr. Svante Lundkvist. It is expected that the Bill will be passed during the current Parliamentary session.

It is estimated that the extra cost of such equipment will be in the region of Kr.300 (£25) per car, but at this stage it is not certain whether Swedish manufacturers will absorb part or all of the in-

crease or pass it on to the customer. Volvo already fits as standard to most of their models a unit in the carburettor system, which is necessary to comply with laws in certain states of the U.S., one of the company's main export markets.

## 7. Methods and equipment for abatement

A 12634 02036, 02320, 02416, 02543, 02682, 02684, 03359, 035171  
Bruselat, E. 03333

REDUCING THE CARBON MONOXIDE CONTENT OF THE EXHAUST GASES OF INTERNAL COMBUSTION ENGINES

British Patent 1,117,487, 19 June 1968 (Application: Germany, 18 Sept. 1964, 3 Nov. 1964, 23 Feb. 1965) (L)

The carbon monoxide content in the exhaust gases of an internal combustion engine is reduced by adding additional air to the fuel-air mixture entering the engine, and then producing turbulent motion in the fuel-air mixture and the added air; a throttle valve being provided for controlling the fuel-air mixture in the fuel-air inlet duct and being linked with a control member controlling the amount of additional air, so that the amount of additional air increases as the throttle opening increases through a first part of its range, then reduces as the throttle opening increases through a second part of its range, and practically no air is applied with fully open throttle.

A 12635 02543, 02683, 02684, 02722, 03333, 03359  
Budanov, G.F., Gitlin, N.N. and Demochka, O.I.

DEVICE FOR PURIFICATION OF EXHAUST GASES (Patent)  
(U.S.A.)

U.S.S.R. 203,381 (Cl. B  
01d), 28 Sep 1967, Appl. 25 Apr 1966; From *Izobret., Prom. Obraztsy, Tovarnye Znaki* 1967, 44(20), 148-9. Exhaust gases, e.g. from internal-combustion engines, are purified by passing through a device consisting of a housing, connected with the engine, and of filters contained inside the housing. Details of design are given.

A 12636 02030, 02043, 02615, 02921, 02954, 03192, 03519, 03593, 03777  
Chieffo, A.B. and McLean, R.H.

REDUCE POLLUTION USING EARLY LEAK DETECTION

Hydrocarb. Proc., May 1968, vol. 47, 149-150. (L)

A system of detection and control helps to minimize pollution from refinery areas which are difficult to control. These are: flare systems, cooling water systems, and pressure relief valves. Caustic scrubbing is used to remove H<sub>2</sub>S generated during refinery operations. The refinery also maintains a small system which monitors air quality. Dustfall and SO<sub>2</sub> concentrations are determined and suspended particulate matter is checked continually with one tape sampler and periodically by means of a high volume filter sampler or electrostatic precipitator sampler. (Abstracted from the paper "Minimizing Pollution

(contd.)

A 12636

(contd.)

Through Early Detection and Control" presented to the Plant Engineering and Maintenance Conference, Philadelphia, March 26, 1968).

## 7. Methods and equipment for abatement

A 12637 02065, 02107, 02482, 02692, 02934, 03118, 03364, 03532  
Dol, V.I. and Rashkevich, I.I.

PROTECTION OF THE AIR AND WATER RESERVOIRS FROM CONTAMINATION BY WASTES FROM COAL-TAR CHEMICAL ENTERPRISES (In Russian)  
(CA)

*Khim. Tekhnol., Respub. Mezhdrom.*  
*Nauch.-Tekh. Sb.* 1967, No. 7, 181-5. The concns. of noxious substances 2 km. from a coke by-product plant exceed the permissible limits for H<sub>2</sub>S, phenols, 5-, 46-, and 5-fold, resp. The carcinogen, 3,4-benzopyrene, occurs in the atm. at considerable distances from these plants. The dephenolization processing installations in many of these plants, while removing ~95% of the phenols and a considerable quantity of inorg. components, have very little effect on the content of org. contaminants. This may be due to the fact that a great deal of contaminants get into the air from the water of the terminal gas cooling stage. More than 100 g. of cyanides, 20 g. of H<sub>2</sub>S, and a considerable amt. of phenols and other contaminants escaped into the atm. from every m.<sup>3</sup> of washwater when it was flowing at the rate of 2 m.<sup>3</sup>/1000 m.<sup>3</sup> of cooled gas.

A 12638 02001, 02520, 02683, 03513, 03626; 03333  
Danov, S.M. et al.

RECOVERY OF SILICON TETRACHLORIDE FROM FLUE GASES (Patent)  
(CA)

U.S.S.R. 202,898 (Cl. C 01b), 28 Sep 1967, Appl. 30 May 1966; From *Izobret., Prom. Obraztsy, Tovarnye Znaki* 1967, 44(20), 28. SiCl<sub>4</sub> is recovered from flue gases by absorption with kerosine and subsequent desorption by heating. To simplify the operation, the kerosine (following the absorption process) is subjected to thermal treatment at 80-100° in the presence of additives, e.g. alkylated benzenes, in an amt. of up to 10%. The resulting products are then sepd. from the kerosine.

A 12639 02043, 02692, 03268, 03324  
Douglass, I.B.

SOME CHEMICAL ASPECTS OF KRAFT ODOR CONTROL  
J. Air Pollut. Control Ass., August 1968, vol. 18, 541-545, 24 refs. (L)

The principal sources of odour in the kraft pulping process are the digester, the direct evaporator, and the recovery furnace. Control of odour from the digester requires the confinement of the noncondensable gases and their destruction by chlorination, burning, or by some other means. Control of odour from the direct evaporator depends on efficient black liquor oxidation. The recovery furnace, which potentially can be the worst source of air pollution, must be operated properly within its rated capacity. The chemistry of various control measures is discussed.

A 12640 02022, 02041, 02043, 02390, 02401, 02614, 02683, 02964,  
03593, 03697, 03880, 03955  
Feiner, B.

INDUSTRIAL AIR CONTAMINANT CONTROL  
Dangerous Properties of Industrial Materials, 3rd edn., Reinhold Book Corp., New York (etc.), 1968, 24-68, 17 refs. (L)

This section of the book covers, inter alia, toxicity of common solvents, control of contaminants emitted into the air by specific industrial processes (vapour degreasing, metal plating), and air cleaning by means of various types of collectors (dust collectors, scrubbers, adsorption devices). Industrial hygiene services (in the U.S.) are listed.

## 7. Methods and equipment for abatement

A 12641 02043, 02416, 02786; 02681, 03532, 03777; 03775

Frederiksen, H.

METHODS OF REDUCING SULPHUR DIOXIDE EMISSIONS IN COMBUSTION GASES (I:

(Norwegian)

(CA)

*Tek. Ukrbl.* 1968, 115(12), 259-62. A survey of possible methods of reducing the emission of  $SO_2$  from fuel combustion was presented. Tall chimneys will reduce the ground concn. of combustion gases. It is feasible to remove S from fuel oils and  $SO_2$  from combustion gases. Coal and fuel oil may be desulfurized by electromagnetic or electrostatic methods and by reaction with  $H_2$ , resp. Addn. of powdered limestone or dolomite during combustion reduces the content of  $SO_2$ .  $NH_3$  also eliminates  $SO_2$ . The combustion gases can be purified by absorption and adsorption processes and by catalytic methods. Present methods are not yet economically feasible.

A 12642 02030, 02611, 03240, 03325, 03331, 03593, 04002

Güntheroth, H.

AN ARTIFICIALLY PRODUCED AEROSOL FOR WET DUST REMOVAL TRIALS ON A SEMI-TECHNICAL SCALE. (EIN KÜNSTLICH ERZEUGTES AEROSOL FÜR NASSENTSTAUBUNGSVERSUCHE IM HALBTECHNISCHEN MASS-STAB). (In German; English summary)  
Staub, Nov. 1968, vol. 28, 496-500, 11 refs. (L)

An aerosol producer is described which produces aerosol satisfying the following requirements: particle size about 0.1 to 1  $\mu m$ , solid and hydrophobic particles, low electric charge, practically no agglomeration, suitable for investigation under the electron microscope, production rate 500 g/h. Reproducible results have been obtained with this aerosol in a PA-venturi scrubber which prove that the water/gas ratio and flow kinetics have the most important influence on dust removal efficiency. The earlier theory that only air losses are of decisive importance has thus been disproved. The wettability of aerosol particles in this size range appears to be of secondary importance. A testing programme is given for explaining the influence of wettability within the particle size range given above in the case of industrial methods of wet dust removal.

A 12643 02681, 03443, 03532, 03777

Herzog, G.

DESULPHURISATION OF FLUE GASES; PROBLEMS AND SOLUTIONS. (In German)

(CA)

*Energie-*

*technik* 1968, 17(12), 539-42. The sources of S or, more esp.,  $SO_2$  in flue gases and the means used to remove them is surveyed briefly. Power plants, esp. those burning high-S coal, are the greatest contributors to this type of air pollution. A brief review of the economics involved leads to the conclusion that, in East Germany, 300-m. stacks afford the most expedient soln. Combining  $SO_2$  with the basic constituents of ashes, based on the reaction of  $CaO$  with  $SO_2$  (cf. W. Petschikowski and T. G. Maltzewska, 1964), is a promising com. development.

A 12644 02015, 02022, 02094, 02683; 03532, 03775; 02214

Rausch, G.

APPLICATION OF ACTIVATED CARBON FOR SULPHUR REMOVAL IN GAS PURIFICATION  
(In German)

(CA)

*Energie-technik* 1968, 17(11), 485-8

A review with 81 references. Factors governing the efficiency of activated carbons, the chem. conversions of the adsorbents including conversions resulting from the addn. of  $NH_3$ , and the performances reported for some installations are briefly discussed.

## 7. Methods and equipment for abatement

A 12645 02015, 02022, 02318, 02320, 02448, 02804, 02915, 03177,  
Kapitanov, Y.T. et al.

ADSORPTION OF RADON ON ACTIVATED CARBON (In Russian)  
(CA)

*Isw.*

*Vyssh. Ucheb. Zaved., Geol. Razved.* 1967, 10(7), 118-25.  
Mine air differs from the atm. in an elevated content of water vapor, CO<sub>2</sub>, N, CO, and other gases and smaller content of O<sub>2</sub>. The adsorption of Rn from such a complex mixt. of gases cannot be calcd. exactly because of insufficient theoretical data explaining adsorption phenomena. A study made of the optimal conditions and types of activated C during purification of mine gases indicated that the absorption capacity of Rn on activated carbons varied markedly. Air with a 100% relative humidity reduced the equil. coeff. of Rn distribution on activated C by a factor of 2. The cooling of air passing through an adsorber increased sharply the adsorption capacity of C. The equil. coeff. reached 10<sup>4</sup> cc./g. for an activated C at -60°. This indicated that when the temp. of the passing air is -80° to -90° and when the rate of airflow is 2 l./min. cm.<sup>2</sup>, the adsorption capacity will be sufficient to obtain equil. between the delivered and decayed Rn in a layer of C ~10 cm. thick.

A 12646 02015, 02022, 02319, 02683, 02691, 02692, 02934

Kostrikov, V.I., Keltaev, N.V. and Nivin, P.I.

USE OF ONE SORBENT TO REMOVE BOTH HYDROGEN SULPHIDE AND CARBON DISULPHIDE FROM RAYON INDUSTRY WASTE GASES (In Russian)  
(CA)

*Khim. Volokna*

1968, (2), 45-7. An app. for removing H<sub>2</sub>S and CS<sub>2</sub> from viscose waste gases by a 1 step process, and a process for removal of the gases are described. The adsorption, desorption, washing, drying, and regeneration, as well as other steps involved in the removal of the CS<sub>2</sub> and H<sub>2</sub>S from waste gases are combined into 1 process, in which the sorbent used is activated C.

A 12647 02018, 02030, 02035, 02715, 02717, 02722, 02915, 03064,  
03422, 03627

Loffler, F.

ON THE ADHESION OF DUST PARTICLES TO FIBRE AND PARTICLE SURFACES. (ÜBER DIE HAFTUNG VON STAUBTEILCHEN AN FASER- UND TEILCHENOBERFLÄCHEN). (In German;  
English summary)

Staub, Nov. 1968, vol. 28, 456-462, 17 refs. (L)

The author reports experimental investigations into the problem of adhesion of quartz particles and limestone particles of irregular form (diameter 5-15  $\mu$ m) on polyamide, polyester and glass fibres, according to a "blow-off" method. The filtration rate, relative air humidity and fibre surface were varied. The mean values for adhesion forces distribution of all the systems investigated were in a range of about 1-10 mdyn and were in good agreement with the van der Waals forces calculated theoretically. The flow velocity required for blowing off the particles are considerably higher than the usual velocities used in the filtration technology.

A 12648 02214, 02399, 02580, 02614, 02760, 03723, 03750, 03843  
Ozker, M.S., McLaughlin, J.F. and Benziger, P.H.

DUST CONTROLS FOR OUTDOOR WORKING AREAS

J. Air Pollut. Control Ass., Aug. 1968, vol. 18, 519-522, 31 refs. (L)

The purpose of informative Report No. 9, prepared by the TI-5 Public Utilities Committee of the Air Pollution Control Association, is to review the various methods available to power plants for controlling dust at working coal storage piles, car dumpers, coal unloading equipment, and fly ash disposal areas.

## 7. Methods and equipment for abatement

A 12649 02094, 02683, 03178, 03532, 03607, 03777, 03780; 03333  
Petersen, H. (and Petersen, G.)

REMOVAL OF SULPHUR DIOXIDE FROM GAS FLOW

British Patent 1,104,583, 28 Feb. 1968 (Application: Germany, 19 Dec. 1964  
and 29 Apr. 1965), 9 pp. (L)

SO<sub>2</sub> is removed from a gas flow by adding gaseous ammonia (or a liquid liberating gaseous ammonia) to the gas, and then injecting a liquid containing ammonium sulphite and/or ammonium bisulphite with or without ammonium sulphate into the gas flow, so that (NH<sub>4</sub>)<sub>2</sub>SO<sub>3</sub> mist is formed; the gas flow then being conveyed to a mechanical separating zone where gas flow and injected liquid are brought into intimate contact and the mist and injected liquid are separated from the gas.

A 12650 02416, 02795, 03234, 03241  
Schwanecke, R.

ELIMINATING NITROGEN OXIDES BY COMBUSTION. (VERNICHUNG VON STICKSTOFFOXID DURCH VERBRENNUNG). (In German; English summary)  
Wass. Luft Betr., June 1968, vol. 12, 372-372, 3 refs. (L)

The furnace used for the method is described and illustrated. The method is said to be economical.

A 12651 03319, 03593  
Seller, E.

DESIGN FOR AIR POLLUTION CONTROL. SELECTING TOWER PACKING (APCA)

*Air Cond. Heat. Vent.* 65 (5), 11, 13.

15, 17 (May 1968). Selection of scrubber packing is based on comparison of the following physical characteristics provided by the manufacturer from his calculations or tests: inertness of material to gas and scrubbing liquor, percentage of free space, specific surface, packed density, and bulk density. Performance characteristics which must also be considered include: low gas pressure drop, high liquid holdup, low liquid spread, and low height of one transfer unit.

A 12652 02614; 02030, 04002  
Weter, E.

EFFECT OF WETTABILITY OF DUSTS ON WET DUST REMOVAL METHODS. (DER EINFLUSS DER BENETZBARKEIT VON STAUBEN BEI DER NASSENTSTAUBUNG). (In German; English summary)  
Staub, Nov. 1968, vol. 28, 462-467, 7 refs. (L)

The determination of wettability by a measuring method is difficult in the case of morphologically heterogeneous dusts. The relationships between wettability, wetting volume, wetting time, liquid level rise in bulk material fillings, and suction velocities are, therefore, investigated on glass powders of known wetting behaviour. Out of all measured values the suction velocity and wetting time (the latter, however, only in the case of a small depth of filling) show the most evident relationship with the wetting behaviour of powders. The relationships are applied to dusts and to phenomena occurring in wet dust removal from gases.

A 12653 02030, 02035, 02014, 02637, 03627, 03700  
Zessack, U.

ON THE COAGULATION OF MIXED DUSTS. (ZUR KOAGULATION GEMISCHTER STAUBE).  
(In German; English summary)  
Staub, Nov. 1968, vol. 28, 474-479, 17 refs. (L)

A mathematical expression of coagulation for monodispersed particles is given which is then extended for spherical particles of any size. The coagulation velocity is related to the diffusion constant and size of the coagulating samples. The intensified coagulation in the field of gravity and the influence of electrical charging of particles on coagulation are discussed. The final section of the paper reports experiments in practical utilization of coagulation of mixed dusts with the purpose of reducing dust hazards in working places.

See also: A 12568, A 12569, A 12570, A 12594, A 12596, A 12623, A 12626,  
A 12628, A 12632

## 8. Miscellaneous

A 12654

02003, 02030, 02386, 02770, 03243, 03312, 03354, 03374,  
03461, 03777, 03780

Altshuller, A.P. et al.

PHOTOXIDATION OF PROPYLENE WITH NITROGEN OXIDE IN THE PRESENCE OF SULFUR DIOXIDE

Envir. Sci. Technol., Sept. 1968, vol. 2, 696-698, 14 refs. (L)

Under dynamic flow conditions, propylene, nitrogen oxides, with or without sulfur dioxide, interact in the presence of light to produce oxidants—peroxyacetyl nitrate, formaldehyde, and acetaldehyde. In a statistical "t" test, no significant difference in rates of consumption of propylene and nitrogen oxides nor in yield of oxidants was found for the various levels of sulfur dioxide used in the experiment (0.0 to 1.2 p.p.m. SO<sub>2</sub>).

A 12655

02002, 02018, 02030, 02035, 03330, 03625, 03627, 04026  
Radzczewski, O.E.

EFFECT OF SURFACE AND FINE STRUCTURE OF PARTICLES ON THEIR ADHESION AND AGGREGATION. (BEDEUTUNG VON OBERFLÄCHE UND INNEREM BAU FÜR HAFTUNG UND AGGREGATION). (In German; English summary)  
Staub, Nov. 1968, vol. 28, 435-439, 32 refs. (L)

The author describes the fine structure of crystalline and amorphous substances and its significance for the form and surface, and also for aggregation and agglomeration. In amorphous SiO<sub>2</sub> brines a short range order is already found which, with increasing degree of order, assumes the form of cristobalite. Free valences on the surface and on crystal edges affect the surface adsorption.

An adsorption in the lattice shows stratified silicates with inner crystalline expansion, and zeolites with channels in the lattice.

A 12656

02018, 02030, 02637, 03133  
Schnabel, W.

DEVELOPMENT OF ELECTROSTATIC CHARGE ON, AND ADHESION OF SMALL PARTICLES.  
(AUFLADUNG UND HAFTUNG KLEINER TEILCHEN). (In German; English summary)  
Staub, Nov. 1968, vol. 28, 448-451, 9 refs. (L)

The electric charge of interfaces and the electrostatic double layer adhesion between solids is discussed on the basis of the band model. In the adhesive system photoconductor-metal, illumination may vary the electronic properties of the photoconductor and hence the electrostatic double layer adhesion without influencing the *van der Waals* forces of attraction. This effect has been demonstrated in experiments on spherical zirconium particles and photoconducting cadmium sulphide substrates using an ultracentrifuge. The experiments showed that the electrostatic double layer may contribute significantly to the adhesion between solids.